REMARKS

The above Amendments and these Remarks are in reply to the Office Action mailed November 28, 2006. Claims 1-11 were pending in the Application prior to the outstanding Office Action. Claim 8 is being amended. Claims 1-11 remain for the Examiner's consideration. Reconsideration and withdrawal of the rejections are respectfully requested.

I. CLAIM REJECTIONS UNDER 35 U.S.C. § 112

Claim 8 is rejected under 35 U.S.C. §112, second paragraph, due to a lack of antecedent basis. Claim 8 has been amended to overcome this rejection. Accordingly, Applicants respectfully request that this rejection be withdrawn.

II. SUMMARY OF CLAIM REJECTIONS UNDER 35 U.S.C. § 103

Claims 1-11 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Seki et al. (US Patent No. 5,680,384) in view of Kelly et al. (US Publication No. 2002/0114244), referred to hereafter respectively as Seki and Kelly.

II. DISCUSSION OF CLAIMS

A. Claims 1-3

Claim 1 is reproduced below for the convenience of the Examiner.

1. A laser driver integrated circuit (LDIC) to drive a laser diode that is located on an optical pick-up unit (OPU) with the LDIC, the LDIC including:

an automatic power controller (APC) to control an output of the laser diode to compensate for changes in characteristics of the laser diode;

a running optical power controller (ROPC) to control the output of the laser diode to compensate for variations in an optical media; and

a write strategy generator (WSG) to implement write strategies;

wherein the APC and ROPC each include there own dedicated offset, gain and sample and hold circuitry, thereby reducing an amount of analog signals to be sent over a flex cable between the OPU and a main board.

Claim 1 requires that a laser driver integrated circuit (LDIC) located on an optical pickup unit (OPU) includes an automatic power controller (APC), a running optical power controller (ROPC) and a write strategy generator (WSG). It was alleged in the Office Action that Seki teaches an LDIC on an OPU that includes an APC. However, it

was admitted in the Office Action that Seki does not disclose that the LDIC on the OPU also includes an ROPC and a WSG.

A.1- Seki does not disclose that an LDIC on an OPU includes an APC

First of all, Applicants respectfully disagree with the assertion in the Office Action that Seki discloses an LDIC on an OPU that includes an APC. According to claim 1, the APC (automatic power controller) controls an output of the laser diode to compensate for changes in characteristics of the laser diode. Such changes to characteristics of the laser diode, as explained in the specification (e.g., see paragraph [0004]), can be due to changes in temperature and/or aging of the laser diode, which can affect, e.g., a threshold current and a slope efficiency of the laser diode. The APC compensates for such changes.

It was alleged that Column 9, lines 22-26 and Column 12, lines 13-46 of Seki teach an LDIC including an APC. However, Column 9, lines 22-26 of Seki only teaches that a laser emission unit 20 of an optical head 1, includes a signal detection circuit 34, a laser output power detection circuit 35, a pre-amplifier circuit 36 and a laser noise reduction circuit 37. (It is presumed for this Reply the term "optical pick-up unit" as used in Applicants' specification, and the term "optical head" as used in Seki, are used to refer to the same thing). None of these four circuits 34, 35, 36 and 37 "compensate for changes in characteristics of the laser diode", as is required by the APC of claim 1. Rather, the signal detection circuit 34 detects a laser beam reflected from a disk surface (see Seki, Column 9, lines 48-54). The laser output detection circuit 35 monitors the power output by the laser beam, but does not compensate for changes in the power (see

Seki, Column 9, lines 39-46). The pre-amplifier circuit 36 amplifies current signals produced by the circuits 34 and 35, and converts them to voltage signals (see Seki Column 9, lines 55-60). The laser noise reduction circuit 37 appears to modulate the signal that drives the laser diode so that laser noise that can affect other circuits is reduced (see Column 10, lines 9-25). Accordingly, since none of the four circuits 34, 35, 36 and 37 "compensate for changes in characteristics of the laser diode", as is required by the APC of claim 1, Seki does not teach or suggest that an LDIC on an OPU includes an APC.

Further, because Seki does not teach that an LDIC on an OPU includes an APC, Seki can not possibly teach that the APC (of the LDIC on the OPU) includes its own dedicated offset, gain and sample and hold circuitry, as specified in claim 1.

If the Examiner disagrees with any of the above, Applicants respectfully request that the Examiner explain in more detail how/where Seki teaches an LDIC on an OPU, where the LDIC includes an APC, where the APC compensates for changes in characteristics of a laser diode.

A.2 - Seki does not provide motivation for placing an ROPC and a WSG, which are typically on a main board, onto an OPU/Optical Head

As mentioned above, it was admitted in the Office Action that Seki does not disclose that the LDIC on the OPU also includes an ROPC and a WSG. However, it was alleged that Kelly discloses an ROPC and WSG, and that Seki provides motivation for "providing these well known components of a pickup apparatus to the wafer disclosed by Seki rather than their conventional placement on the main board, [because it] results in a

reduction of manufacturing cost and time (Column 10, lines 33-41) and a reduction in noise during the communication between components (Column 10, lines 1-8)." For at least the reasons set forth below, Applicants respectfully disagree with these assertions.

First, Applicants assert that while an ROPC and WSG may be well known components, they are not well known components of an optical pick-up unit (OPU). Rather, an ROPC and WSG are conventionally located on a main board that is connected to an OPU by a flex cable. By "main board" Applicants are referring to is the board of an optical drive that does not move. Such a main board typically includes the host controller, as shown in FIGS. 1 and 2 of Applicants' application. In contrast, an optical pick-up unit moves so that it can be used to read from and possibly write to different locations on an optical media. The main board and the OPU are connected by a flex cable, which is bendable, and thus allows the OPU to move relative to the main board while being in electrical communication with the main board. In other words, the "main board" referred to in Applicants' claim is not a board or wafer on the OPU/optical head. This is clear from Applicants claims and the specification.

Further, Applicants respectfully assert that Seki does not provide motivation for migrating an ROPC and WSG from a main board to an OPU. As mentioned above, it was asserted that such motivation was provided at Column 10, lines 1-8 of Seki, and Column 10, lines 26-33 of Seki. These sections of Seki are discussed below.

Column 10, lines 1-8 of Seki says that because the signal detection circuit 34, the laser output power detection circuit 35, the pre-amplifier circuit 36 and the laser noise reduction circuit 37 are on the same wafer 30, the length of the wires interconnecting the circuits are very short, thereby reducing noise that may occur when signals are provided

to the pre-amplifier 36. Column 10, lines 33-41 of Seki says that because the signal detection circuit 34, the laser output power detection circuit 35, the pre-amplifier circuit 36 and the laser noise reduction circuit 37 are on the same wafer 30, the manufacturing time and costs are decreased as compared to a conventional optical head where such circuits are on different wafers. As explained at column 10, lines 26-33 of Seki, by putting these four circuits 34, 35, 36 and 37 on the same wafer 30, which is within the laser emission unit 20, "it is not necessary to have several independent elements in the optical head in order to perform the functions of the above four circuits." In other words, Seki merely teaches that it is beneficial to combine multiple circuits already known to be located in the optical head onto a single wafer in the optical head. This is quite different than what is being claimed.

An automatic power controller (APC) and a write strategy generator (WSG) are typically located on a main board, which is separated from an optical pick-up unit (OPU) by a flex cable. Seki never teaches or suggests that it would be desirable to move elements that are conventionally located on a main circuit board into the optical head/OPU. Rather, as explained in detail above, Seki teaches combining separate circuits already known to be located in an optical head/OPU onto a single wafer. Stated another way, the portions of Seki pointed out in the Office Action do not teach adding circuits to the optical head, but rather teach combining circuits that already were on an optical head onto a single wafer. One of ordinary skill in the art reading Seki at best would be motivated to combine even more circuits located in an optical head/OPU into a single wafer. This is quite different than moving circuits conventional on a main board into an optical head/OPU.

For at least the reasons set forth above, Applicants respectfully request that the Examiner reconsider and withdraw the 103 rejection of claim 1.

Claims 2 and 3 depend from and add additional features to claim 1. Accordingly, claims 2 and 3 are believed to be patentable over the applied references for at least the reasons discussed above with regards to claim 1. These dependent claims are also believed to be patentable for the features that they add.

For example, **Claim 2** specifies that the "the APC is adapted to receive power control signals over the flex cable that connects the OPU with a controller on the main board, and wherein the LDIC determines a current for which to drive the laser diode, based at least in part on the power control signal." It was alleged in the Office Action that these features of claim 2 are taught by Column 10, lines 1-8 and 33-41 of Seki. However, as mentioned above, Column 10, lines 1-8 of Seki merely teaches that the length of wires are shortened when circuits previously on an optical head are combined on one wafer on the optical head. Column 10, lines 33-41 of Seki talks about how the combining of the circuits onto a single wafer saves cost and size. None of these portions of Seki teach that "the APC [of the LDIC on the OPU] is adapted to receive power control signals over the flex cable that connects the OPU with a controller on the main board, and wherein the LDIC determines a current for which to drive the laser diode, based at least in part on the power control signal." Kelly does not teach this deficiency of Seki. Accordingly, claim 2 is also believed to be patentable over the applied references for this additional reason.

B Claims 4-10

Claim 4 is reproduced below for the convenience of the Examiner.

4. A chip-set to be located on an optical pick-up unit (OPU) that can communicate with components on a main board over a flex cable, the chip-set comprising:

a laser driver integrated circuit (LDIC) adapted to drive a laser diode, the LDIC including:

an automatic power controller (APC);

a running optical power controller (ROPC); and

a power monitor integrated circuit (PMIC) to monitor the laser diode, the PMIC including its own dedicated offset, gain and sample-and-hold circuitry; and

a photo-detector integrated circuit (PDIC) to detect light produced by the laser diode after the light has been reflected from an optical media, the PDIC including its own dedicated offset, gain and sample-and-hold circuitry.

Claim 4 is directed to a chip-set to be located on an optical pick-up unit (OPU) that can communicate with components on a main board over a flex cable, where the chip-set includes, among other elements, a laser driver integrated circuit (LDIC) adapted to drive a laser diode, where the LDIC includes an automatic power controller (APC) and a running optical power controller (ROPC). For similar reasons to those discussed above with reference to FIG. 1, Applicants assert that Seki and Kelley, alone or in combination,

do not teach these features of claim 1. Accordingly, Applicants respectfully request that the 103(a) rejection of claim 4 be reconsidered and withdrawn. **Claims 5-10** depend from and add additional features to claim 4. Accordingly, claims 5-10 are believed to be patentable over the applied references for at least the reasons discussed above with regards to claim 5, as well as for the features that they add. For example, **Claim 9** is believed to be patentable for similar reasons to those discussed above with regards to claim 2.

C. Claim 11

Claim 11 is directed to a laser driver integrated circuit (LDIC) to drive a laser diode that is located on an optical pick-up unit (OPU) with the LDIC. The claimed LDIC includes an automatic power controller (APC) to control an output of the laser diode to compensate for changes in characteristics of the laser diode, and a running optical power controller (ROPC) to control the output of the laser diode to compensate for variations in an optical media. The APC and ROPC each include there own dedicated offset, gain and sample and hold circuitry, thereby reducing an amount of analog signals to be sent over a flex cable between the OPU and a main board.

For similar reasons to those discussed above with reference to claim 1, Applicants respectfully request that the rejection of claim 11 be reconsidered and withdrawn.

IV. CONCLUSION

In light of the above, it is respectfully requested that all outstanding rejections be reconsidered and withdrawn. The Examiner is respectfully requested to telephone the undersigned if he can assist in any way in expediting issuance of a patent.

The Commissioner is authorized to charge the required fee and any underpayment of fees or credit any overpayment to Deposit Account No. 06-1325 for any matter in connection with this reply, including any fee for extension of time, which may be required.

Respectfully submitted,

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